

REMARKS

The Office Action dated December 6, 2006 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1, 2, 18-23, 26, and 27 are amended to more particularly point out and distinctly claim the subject matter of the present invention. Support for the amendments is found at least on page 84, line 24 - page 85, line 11, and page 85, lines 13 - 16. No new matter is added. Claims 1, 2 and 4-27 are respectfully submitted for consideration.

The Office Action rejected claims 1, 2 and 4-25 under 35 U.S.C. 101 as being directed to non-statutory subject matter. The Office Action asserted that the claims lack functionality and applicability and further asserted that the step of “determining a virtual base station locator” is an algorithm.

Applicants respectfully submit that claims 1, 2 and 4-17 are directed to a “process” which is statutory subject matter under 35 US.C. 101. A “process” defines actions that set forth a series of steps to be performed. As established in current US patent law, a process must produce a “useful, concrete and tangible result.” See State Street Bank & Trust Co., v. Signature Financial Group Inc., 149 F.3d 1368, 47 USPQ2d 1596 (Fed. Cir. 1998). Claims 1 and 18-23 are directed to methods of estimating the location of a mobile device, the result of which is achieved by performing the recited steps. Thus, the method is “useful” as described at least on page 1, lines 18-26 of the specification of the present invention. The current claims are “concrete” because the one skilled in the art would

recognize that result of performing the process steps is reproducible. The “tangible” result of the recited process is an estimate of the location of a mobile device, and these claims therefore meet the requirements of State Street. Further, the step of “determining a virtual base station locator” is a step in the recited process of estimating the location of a mobile device. In order to further clarify the above, claim 1 is amended to recite that the estimated location of the mobile device is determined based at least on the virtual base station estimate, and claims 18-23 are amended to add the step of determining the location of the mobile device based at least on the location estimate. Applicants respectfully submit that in light of the above, claims 1, 2 and 4-23 are directed to statutory subject matter. Accordingly, withdrawal of the rejection under 35 U.S.C. 101 is respectfully requested.

Applicants note that claim 27 was not properly rejected in the Office Action but is discussed in the Office Action. Thus, it is not clear if claim 27 is being rejected in the Office Action. Thus, if the current claims are not in condition for allowance, Applicants request a new, non-final Office Action that properly rejects claim 27 under 35 U.S.C. 101. As such, Applicants respectfully submit that it is well-established in US Patent law that a computer processing instructions becomes a different series of units or elements. Thus, Applicants submit that claim 27 is properly directed to a system which is patentable subject matter under 35 U.S.C. 101.

The Office Action rejected claim 26 under 35 U.S.C. 112, second paragraph because it is not clear to which structures the elements recited in claim 26 are being referred to in the specification of the present application.

According to US patent law, claims written in means-plus-function terminology must relate to corresponding structures or acts in the specification itself, in a way that one skilled in the art will understand what structure or acts will perform the recited function. (See Atmel Corp. v. Information Storage Devices, Inc., 198 F.3d 1374, 1381, 53 USPQ2d 1225, 1230 (Fed. Cir. 1999) MPEP 2181. Accordingly, Applicants respectfully submit that the means recited in claim 26 are clearly described in specification in a way such that one skilled in the art will understand what structure or acts will perform the functions recited in claim 26. For example, the acts for performing the function of collecting location information are found at least on page 82 lines 16-19 of the specification which describes the function of collecting location information i.e., timing advance and received signal levels which are measured by the mobile station. Thus, the acts of performing this function are well known in the art and are therefore, adequately described in the specification. Similarly, the acts for selecting at least one of a plurality of different location methods to provide a location estimate and providing a location estimate based on the at least one selected location method, is described in at least on page 82 line 24 – page 83 line 2 and page 83 lines 4-8 respectively.

Still further, Applicants submit that support for the structures for performing the functions of claim 26 are also illustrated in Figs. 2 and 17. For example the blocks S1-S8

illustrate “units” that perform the functions recited in claim 26. Accordingly, withdrawal of the rejection under 35 U.S.C. 112, second paragraph is respectfully requested.

The Office Action rejected claims 1-17 and 24-27 under 35 U.S.C. 103(a) as being obvious over US Patent No. 6,295,454 to Havinis et al. (Havinis), in view of US Patent No. 5,844,522 to Sheffer et al. (Sheffer). The Office Action took the position that Havinis disclosed all of the features of these claims except the determination of a base station estimate. The Office Action asserted that Sheffer disclosed these features. Applicants respectfully submit that the cited references, taken individually or in combination, fail to disclose or suggest all of the features recited in any of the pending claims. Applicants note that claim 3 was cancelled in the Response that was filed on June 30, 2006.

Claim 1, from which claims 2, 4-17, 24 and 25 depend, is directed to a method of estimating the location of a mobile device including, collecting location information. At least one of a plurality of different location methods is selected to provide a location estimate said methods comprising using cell identity information. A location estimate is determined based on the at least one selected location method. A virtual base station estimate is determined, dependent on the collected location information. A location estimate is provided based on at least one of the at least one selected location method estimate and the virtual base station estimate.

Claim 26 is directed to a system for estimating the location of a mobile device that includes a means for collecting location information. The system includes a means for

selecting at least one of a plurality of different location methods to provide a location estimate said methods using cell identity information. The system further includes a means for determining a location estimate based on the at least one selected location method, and a means for determining a virtual base station estimate. The system further includes a means for providing a location estimate based on at least one of the at least one selected location method estimate, and the virtual base station estimate.

Claim 27 is directed to a system for estimating the location of a mobile device. A collecting unit is configured to collect location information. A selecting unit is configured to select at least one of a plurality of different location methods to provide a location estimate, said methods using cell identity information. A determining unit is configured to determine a location estimate based on the at least one selected location method and to determine a virtual base station estimate. A providing unit is configured to provide a location estimate based on at least one of the at least one selected location method estimate and the virtual base station estimate.

According to certain embodiments, the present invention improves on the systems described in the prior art by generating a “virtual base station” from the determination of the estimate of the current serving cell using the signals received from neighboring cells and from this virtual base station estimate and the received signal values calculates a virtual base station location estimate in addition to the received location estimate determined using the “real” serving cell and any neighboring cells which are available.

This virtual base station location estimate can therefore be used to assist in the determination of the location of the base station and may be selected along with, or as well as, the location estimate from the real values. Applicants respectfully submit that the cited references fail to disclose or suggest these features or the advantages thereof.

As previously discussed, Havinis is directed to a telecommunications system and method where a mobile station is able to calculate its own position within a cellular network and reports the calculated location to the requester. The mobile station can determine and store the location of the mobile station (MS), along with a time stamp, in a memory at predefined intervals determined by the requestor. Once the location information has been calculated and stored, the MS can report all of the relevant historical location information to the requestor at predefined intervals determined by the requestor.

Sheffer is directed to a wireless network base location system where each antenna sight in the network includes an “agile vector sensor unit (AVS). Each of these units is arranged to lock onto the reverse voice channel to determine the azimuth and signal strength and track any change in the voice channel by monitoring the forward voice channel. The AVS unit in the serving cell is assisted in detecting the location of the mobile device by the AVS unit in neighboring cells.

Furthermore, where the mobile device is detected as moving out of a serving cell, the AVS unit for the proposed serving cell and the neighboring unit surrounding this

proposed AVS cell, can be temporally activated to assist while the mobile device carries out a handover.

Applicants respectfully submit that the cited references fail to disclose or suggest at least the features of determining a virtual base station estimate dependent on the collected location information, and providing a location estimate based on at least one of the at least one selected location method estimate and the virtual base station estimate, as recited in claim 1 and similarly recited in claims 26 and 27. The Office Action relied on Sheffer to disclose these features. However, Sheffer merely describes a system which indicates that, as the mobile device moves from an original serving or active cell, the computer work station software determines that further cells agile vector sensor (AVS) units are to be activated. See column 20, lines 43-57 of Sheffer. Applicants respectfully submit that the cited references are silent with regards to a virtual base station location estimate being calculated.

Applicants submit that because claims 2, 4-17, 24 and 25 depend from claim 1, these claims are allowable at least for the same reasons as claim 1, as well as for the additional features recited in these dependent claims.

Based on the above, Applicants respectfully submit that the cited references fail to disclose or suggest all of the features recited in claims 1, 2, 4-17 and 24-27. Accordingly, withdrawal of the rejection under 35 U.S.C. 103(a) is respectfully requested.

Applicants are grateful for the acknowledgement that claims 18-23 would be allowable if rewritten or amended to overcome the rejections under 35 U.S.C. 112,

second paragraph. As discussed above, claims 18-23 are amended to more particularly point out and distinctly claim the subject matter of the present invention. Thus, claims 18-23 are allowable.

Applicants respectfully submit that each of claims 1, 2, 4-17 and 24-27 recites features that are neither disclosed nor suggested in the cited references and that claims 18-23 are amended to more particularly point out and distinctly claim the subject matter of the present invention. Accordingly, it is respectfully requested that each of claims 1, 2 and 4-27 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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